

REMARKS

In an Office Action dated November 16, 2004, claims 1-6, 9-11, and 34-36, all of the claims under consideration in the subject patent application, were rejected. By amendment above, claims 1 and 6 have been rewritten. Support for the amendments to claim 1 can be found on page 7, lines 10-15, page 8, lines 20-31, page 16, line 24- page 17, line 6, page 19, lines 17-32, and figure 1 of the specification. Support for the amendments in claim 4 can be found on page 26, lines 19-25 of the specification. The amendments to claim 6 merely correct a typographical error.

Reconsideration of this application and allowance of the claims is respectfully requested in view of the foregoing amendments and the following remarks.

The Examiner has rejected claims 1-6, 11 and 34-36 as anticipated by Winkler et al. (US 5,677,195). The Examiner asserts that Winkler et al. teaches the synthesis of polymer substrate arrays (for example oligonucleotides) for use in screening studies for determining binding affinity of sample analytes. According to the Examiner this synthesis comprises providing a support comprising at least one channel comprising a conduit having an inlet and outlet for passing fluid from the inlet to the outlet (e.g. Winkler et al. figures 4-8), passing liquid with building blocks for synthesizing polymeric receptors through the channel(s) of the support body, and time specifically immobilizing the receptor building blocks in each case on predetermined positions in the channel(s) by illumination. The Examiner references figures 13-15 asserting that these figures illustrate this synthesis. According to the Examiner the method of Winkler et al. can attach the receptor in a homogeneous or heterogeneous manner. Further, the Examiner states that Winkler et al. teach a large number of parallel channels, which provide a three dimensional

substrate for synthesis with nucleic acids to form a plurality of different polymer receptors. Additionally, the Examiner asserts that the reference teaches that the substrate can exist as capillary channels. Moreover, the Examiner also rejected applicants' arguments in applicants' response to the previous Office Action. According to the Examiner the three dimensional surfaces for synthesis as argued by applicants only applies to claims 34-36. Further, the Examiner asserts that Winkler et al. teaches a 3D channel as a combination of a flat surface or biochip mounted on a support which has channels which forms a rectangle possessing a 3D surface area for synthesis. Also, the Examiner states that the Winkler et al. reference teaches that the substrate on to which the polymeric receptors are synthesized is preferentially an array of capillary channels. Further, the Examiner asserts that Winkler et al teaches a fluid tight conduit with a top, bottom and two sides. According to the Examiner the channels in Winkler et al include substrates comprising "tubing" and "capillaries" which contains flow through regions, wherein the substrate in preferred embodiments can be comprised of glass, pyrex, quartz or silicon materials. The Examiner asserts that the rationale that a small reference genus can serve to either anticipate or alternatively render obvious a species is proper.

Applicants submit that the present invention is substantially different from the Winkler et al. method. It appears the Examiner is reading the channel as claimed in the present invention to include open channels, and not just pipe or tube like channels. To more clearly define the channels in the present claims as pipe or tube like channels, applicants previously amended the claims to be directed to a conduit having with a top, a bottom and two sides through which fluid flows. It appears that the Examiner is not distinguishing a conduit as defined in the claims from an open channel. The Examiner therefore has adopted the broad view that a conduit reads on an

open channel or trench. Applicants submit that the physical appearance of the channel and the array of channels in which synthesis takes place is now more clearly defined. Claim 1, as amended, is directed to a method for producing a support for determining analytes wherein the synthesis process is monitored and wherein the support is optically transparent at least in the region of the reaction positions and is arranged between a programmable light source matrix and a detector matrix. Applicants submit that the disclosure in Winkler et al lacks the essential elements of the claimed invention of the synthesis process being monitored and the support being optically transparent at least in the region of the reaction positions and being arranged between the programmable light source matrix and a detector matrix.

Further, applicants submit that, although Winkler et al. teaches a method of performing combinatorial chemistry on the surface of a substrate, this surface is very different from the surface of the present invention. This is because the surface in Winkler et al. contains grooves, trenches and depressions but is otherwise a flat surface. In addition, Winkler's substrate (reaction surface) may be on a support which may have channels or grooves for providing the reactants to the substrate. Therefore, in Winkler et al. the channels, which may be pipe or tube like, are only located on the support at a position at which no reaction occurs. In addition, in Winkler et al the reactions all occur on the substrate surface which may be flat or have trenches, grooves or depressions. Each trench, groove or depression will accommodate a polymerization reaction and is thereby addressable through the channels. The analyte in later diagnostics therefore only interacts with a composition in a particular groove, trench or depression. All references made by the Examiner to the Winkler et al. disclosure teach or suggest the use of a substrate and a channel block. The channel block only provides a means for delivering reactants

to the substrate, and no reaction occurs on the surface of the channel block. Therefore, as opposed to the present invention, Winkler et al. does not teach or suggest the synthesis of polymeric receptors on a three dimensional surface in a conduit as presently claimed.

In the presently claimed invention a channel or array of channels is located in a support wherein each channel allows for reactants to flow through the support. The reactants are activated by light at certain addressable positions in the channel to polymerize and form a substrate/receptor for an analyte. In the present invention a single channel may contain an array of different polymerization products. This is in contrast to Winkler et al. where the (polymerized) reaction products are limited to a defined trench, groove, or depression on the reaction surface.

Therefore, the presently claimed invention differs from the prior art references in that the synthesis process is monitored and wherein the support is optically transparent in at least the region of the reaction positions and is arranged between a programmable light source matrix and a detector matrix. These essential elements are lacking from the Winkler et al disclosure. Further, each channel located in the support of the present application contains an array of different polymers after synthesis, whereas in the prior art the array consists of a flat surface having a series of trenches, grooves or depressions, each of which contains a particular polymer. Furthermore, there is no mention or suggestion whatsoever in Winkler et al. that synthesis of the polymeric receptor is on a three dimensional surface of a conduit with a top, a bottom and two sides as claimed. Therefore, the Winkler et al. reference lacks an essential claimed element and does not teach or suggests the presently claimed invention.

Applicants therefore submit that claims 1-6, 11, and 34-36 of the pending application are not anticipated by Winkler et al (US 5,677,195). Withdrawal of the rejection is respectfully requested.

The Examiner also rejected claims 1-6, 9-11, and 34-36 as obvious over Winkler et al. and Fodor et al. (WO 92/10092) (incorporated by reference in the Winkler et al. reference). The Examiner in his rejection asserts the same teachings by Winkler et al. as asserted in the anticipatory rejection made by the Examiner. According to the Examiner the Winkler et al. reference method differs from the claimed invention for failing to explicitly teach the use of a “programmable light source matrix” for illumination and computer program patterning of polymeric receptors. However, the Examiner states that the Winkler et al. reference indicates that the computer programmable light source matrix and patterning method according to Fodor et al. is an elegant method for such use. Therefore, the Examiner asserts that there is motivation to combine the Winkler et al. reference with the Fodor et al. reference making the synthesis method claimed obvious.

Applicants submit that Winkler et al does not teach or suggest the presently claimed invention as described above. Furthermore, Fodor et al. is directed to a computer programmable light source matrix for illumination and patterning in polymeric receptor synthesis but it does not teach or suggest the 3D reaction surface as claimed in the present invention in a large library array, and thus does not cure the defects of the Winkler et al. reference. Applicants submit that Fodor et al. does not teach or suggest a key element which is also not taught or suggested by the primary reference and thus the presently claimed invention is nonobvious over the cited prior art combination. Therefore, even if one combines the teachings of both Winkler et al. and Fodor et

al., the method as presently claimed is not taught or suggested because neither Winkler et al. or Fodor et al. teach or suggest the monitored synthesis of polymeric receptors on a three dimensional surface in a conduit of a transparent support arranged between a programmable light source matrix and a detector matrix.

Applicants therefore submit that claims 1-6, 11, and 34-36 of the present application are not obvious over Winkler et al (US 5,677,195) and Fodor et al (WO 92/10092). Withdrawal of the rejection is respectfully requested.

The Examiner has also rejected claims 1-6, 9-11 and 34-36 as obvious over Winkler et al. alone or combined with Fodor et al. (WO 92/10092) as applied to the claims above, and further in view of Yeung et al. (US patent No. 5,741,411). According to the Examiner the teaching of Winkler et al. alone or in view of Fodor et al. described above suggests the current invention. The Examiner states that in so far as claims 34 and 36 are directed to the selection of a channel possessing a 3D reactive surface, Yeung et al. provides motivation to one of ordinary skill in the art to utilize such 3D channels in the Winkler et al. method.

Applicants submit that Winkler et al and/or Fodor et al either alone or in combination do not teach or suggest the presently claimed invention for reasons described above. In addition, there is no motivation to combine Winkler et al., alone or combined with Fodor et al., with Yeung et al. to teach the presently claimed invention. Yeung et al. disclose a method of using an array of capillary tubes in a particular electrophoresis method. This electrophoresis method can separate and detect oligonucleotides wherein the detection step uses a light source. The mere fact that nucleotides may flow through these capillary tubes in such electrophoresis method is irrelevant to a method of synthesizing polymeric receptors on a three dimensional surface in a

conduit. No synthesis takes place in the capillary tubes of Yeung et al. and therefore there is no motivation to combine the array of tubes taught by Yeung et al. in the synthesis method as taught by Winkler et al. Thus the claims of the present invention are non-obvious over Winkler et al. alone or combined with Fodor et al. in view of Yeung et al.

Applicants therefore submit that claims 1-6, 9-11, and 34-36 of the pending application are not obvious over Winkler et al (US 5,677,195) alone or combined with Fodor et al (WO 92/10092), or in view of Yeung et al (US 5,741,411). Withdrawal of the rejection is respectfully requested.

Claim 6 was objected to because the spelling of the term “oligoneclectides” is incorrect. Applicants amended claim 6 to correct the typographical error. Accordingly, withdrawal of the rejection is respectfully requested.

Claims 1-6, 9-11 and 34-36 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. According to the Examiner the term “large number of channels” in claim 4 and the term “fluid tight” in claim are relative terms which renders the claim indefinite. Further, the Examiner asserts that the term “the support body” in claim 1 lacks antecedent basis.

Applicants submit that claim 4, as amended, more clearly defines the scope of the invention. Claim 4, as amended, is directed to a support having several hundreds of channels in a chip, as described in the specification on page 26, lines 19-25. Applicants therefore submit that claim 4, as amended more clearly defines the subject matter regarded as the invention. Further, applicants submit that claim 1, as amended, more clearly defines the subject matter regarded as the invention. Applicants submit that claim 1, as amended, is directed to a “support comprising a

support body comprising at least one channel” providing antecedent basis for the term “support body” in steps (a) and (b). In addition, applicants submit that the term “fluid tight” has its ordinary meaning of not allowing fluid to leak from the conduit, and is therefore not a relative term. Applicants, therefore submit that claim 1 as amended more clearly defines the subject matter of the invention. Thus, claims 1-6, 9-11 and 34-36, as amended in claims 1 and 4, clearly define the subject matter regarded as the invention. Withdrawal of the rejection is respectfully requested.

Claims 1-6, 9-11 and 34-36 were rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. According to the Examiner the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. The Examiner asserts that the term “fluid tight” is not supported by the disclosure.

Applicants submit that the term “fluid tight” is supported by the disclosure. Applicants submit that the disclosure inherently supports the term “fluid tight” as in claim 1. For example, the specification on page 11, lines 29-37 discloses that the channels (conduits) in the support are microchannels, preferably capillaries. Therefore, claim 1 complies with the written description requirement and claims 2-6, 9-11, and 34-36 dependent either directly or indirectly from claim 1. For these reasons applicants submit that claims 1-6, 9-11 and 34-36 comply with the written description requirement as in 35 U.S.C. §112, first paragraph. Withdrawal of the rejection is respectfully requested.

Claims 1-6, 9-11 and 34-36 were rejected under the judicially created doctrine of obviousness type double patenting as being unpatentable over claims 1-26 of US Patent No. 6,586,211 ("the '211 patent"). According to the Examiner the claims of the '211 patent by Stahler et al teach a method for producing polymers by attaching oligomeric building blocks by parallel syntheses on different areas of a common support for specific interaction with other molecules wherein the building blocks or nucleic acid fragments are synthesized by location and/or time resolved illumination by means of a programmable light matrix. The Examiner asserts that these patent claims encompass the subject matter claimed in the present application.

Applicants submit that the subject matter of the presently claimed invention is distinct and non-obvious from claim 1-26 of the '211 patent. The '211 patent claims a method of synthesis of polymers wherein only a plurality of oligomeric building blocks for the polymers are synthesized on a support. Subsequently, the plurality of oligomeric building blocks are detached from this support, after which a polymer is synthesized by bringing together these oligomeric building blocks, as in the sole independent claim 1 of the '211 patent. In contrast, the presently claimed invention is directed to a method for producing a support in which polymeric receptors are synthesized in its channels for determining analytes. Therefore, applicants submit that the presently claimed invention is distinct and non-obvious over claims 1-26 of the '211 patent. Accordingly, applicants submit that claims 1-6, 9-11, and 34-36 are not unpatentable over claims 1-26 of US Patent No. 6,586,211 for obviousness type double patenting. Withdrawal of the rejection is respectfully requested.

Claims 1-6, 9-11 and 34-36 were provisionally rejected under the judicially created doctrine of obviousness type double patenting as being unpatentable over claims 31-60 of

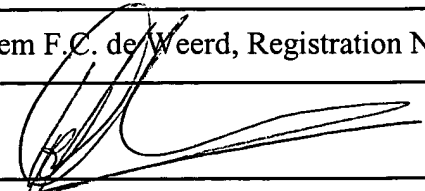
compending Application No. 10/399,450. According to the Examiner the application claims are drawn to a method for integrated syntheses and analyte determination on a support and an apparatus for carrying out the method which teaches the method of claim 1 of the present application. The Examiner asserts the rejection is a provisional obviousness type double patenting rejection because the conflicting claims have not in fact been patented.

Applicants submit herewith a terminal disclaimer. Applicants have disclaimed the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on Application No. 10/399,450, as set forth in the terminal disclaimer. Accordingly, Applicants submit that claims 1-6, 9-11 and 34-36 are not unpatentable over claims 31-60 of Application No. 10/399,450 under the judicially created doctrine of obviousness-type double patenting. Withdrawal of the rejection is respectfully requested.

Claims 1-6, 9-11 and 34-36 were provisionally rejected under 35 U.S.C. §101 as claiming the same invention as that of claims 1-6, 9-11 and 34-36 of compending Application No. 10/727,566. Applicants submit that the claims of the published application No. 10/727,566 differ from the pending claims. Application No. 10/727,566 is a divisional application from the present application in which applicants filed a preliminary amendment cancelling claims 1-38 and added new claims 39-54. The subject matter of claims 39-54 in the compending application No. 10/727,566 is directed to the subject matter of non-elected claims 12-27 of the present invention. Therefore, applicants submit that the present application and the compending application No. 10/727,566 do not claim the same invention. Withdrawal of the rejection is respectfully requested.

Applicants submit that the present application is now in condition for allowance.

Reconsideration and favorable action are earnestly requested.

RESPECTFULLY SUBMITTED,					
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